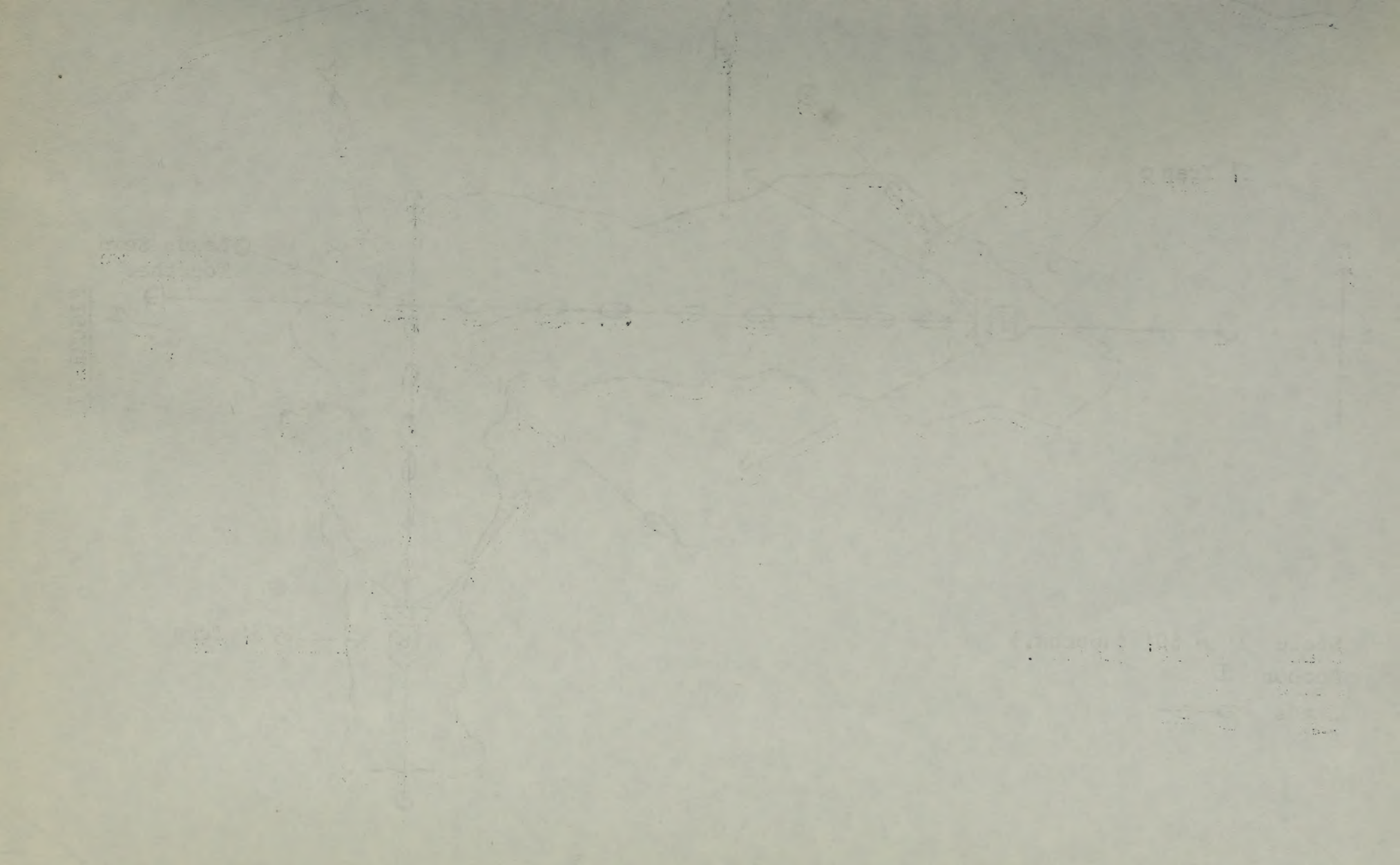

NO. 83

SEPTEMBER, 1965

RESOURCE MANAGEMENT REPORT

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

HON. A. KELSO ROBERTS, Q.C.,
Minister

F.A. MacDOUGALL,
Deputy Minister,

NO. 83 SEPTEMBER, 1965

RESOURCE MANAGEMENT REPORT

Fish and Wildlife Branch

ONTARIO

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HON. A. KELSO ROBERTS, Q.C.,
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RUFFED GROUSE HUNTING STUDY, COCHRANE DISTRICT, 1964

by
W. A. Creighton
Biologist

Abstract

This report covers grouse hunter success and hunting effort in the Cochrane District. Information collected revealed that 35 hunters on foot killed 113 ruffed, 9 spruce and one sharp-tailed grouse in 296-1/4 hours of hunting or 49.0 per cent of the grouse encountered. Hunters travelling secondary roads by car spotted 124 and bagged 78 grouse for a kill of 62.1 per cent. Hunters on foot in the bush in 1964 saw more grouse than in 1963 yet failed to harvest the birds. In 1964 only 49 per cent were bagged compared to 62 per cent of the grouse encountered in 1962 and 1963.

Introduction

Hunter success and hunting effort information are considered in the following report. Hunter success data were collected throughout the fall hunting season by conservation officers in the field and through distribution of hunting study cards to a selected group of keen grouse hunters. Sex and age ratios of grouse shot were determined from sets of wings and tails forwarded to District Office by interested hunters. Sex determination was made using length of central two tail feathers or gonadal examination. Age was determined by examination of the pattern of primary molt or probe of the bursa.

Of the 115 Ruffed Grouse Hunting Study cards returned to District Office, 102 were processed to reveal hunter success and hunting effort. Thirteen study cards were discarded because the information pertained to grouse observed but not bagged while moose hunting or such similar situations. Of the 102 study cards analysed 67 or 65.7 per cent were from hunters on foot in the bush and 35 or 34.3 per cent indicated hunting from cars. A 43.4 per cent return was obtained from 53 sportsmen contacted.

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Information obtained from 102 Ruffed Grouse Hunting Study cards indicated that 35 avid hunters, representing 23 parties, hunting afoot killed 113 ruffed, 9 spruce and 1 sharp-tailed grouse in 296-1/4 hours. This group of hunters saw 251 grouse and

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Hunting on Foot - 1964

Information obtained from 102 Ruffed Grouse Hunting Study cards indicated that 35 avid hunters, representing 23 parties, hunting afoot killed 113 ruffed, 9 spruce and 1 sharp-tailed grouse in 296-1/4 hours. This group of hunters saw 221 grouse and

harvested 123, or 49.0 per cent of the grouse encountered. Hunters on foot saw an average of 84.7 grouse and shot 41.5 birds for each 100 hunter-hours in the bush during the 1964 hunting season.

Six of the 23 hunting parties or 26.1 per cent used dogs for 39 of the 76 hunting excursions recorded.

Hunting by Car - 1964

Thirty-two hunters who travelled the District secondary roads in search of grouse spotted 124 and bagged 78, or a kill of 62.1 per cent. This year 3.1 grouse were shot and 4.9 were seen for each 100 car-miles.

Tables I and II, respectively, summarize the information pertinent to hunting success for hunters afoot and for those who searched for birds by driving along District roads.

Tables III and IV provide comparable data over the three year study period 1962 to 1964.

Temporal Distribution of Kill

The temporal distribution of 201 ruffed grouse has been presented in graphic form in Figure 1. Each column represents seven days during the entire open season.

Table I Ruffed grouse hunters success on foot in the bush - 1964

Hunter Success Data	Sept.15 to Oct.26	Oct.27 to Dec.15	Complete Season (Total)
No. of Hunter-hours	215.25	81	296.25
No. of Birds Seen	193	58	251
No. of Birds Shot	92	31	123
Birds Seen/100 Hunter-hours	-	-	84.7
Birds Shot/100 Hunter-hours	-	-	41.5
No. of Hunter-hours/Bird Seen	1.1	1.4	1.2
No. of Hunter-hours/Bird Shot	2.3	2.6	2.4
Occasions dogs used	16	23	39
Occasions dogs not used	21	16	37

Table II Ruffed grouse hunters success on roads - 1964

Hunter Success Data	Sept.15 to Oct. 26	Oct.26 to Dec.15	Complete Season (Totals)
No. of Hunters	22	10	32
Miles Travelled	1865	676	2541
No. of Birds Seen	99	25	124
No. of Birds Shot	60	18	78
Miles per Bird Seen	18.8	27.0	20.5
Miles per Bird Shot	31.1	37.6	32.6
Birds Seen/100 Miles	-	-	4.9
Birds Shot/100 Miles	-	-	3.1

Table III Ruffed grouse hunter success on foot in the bush 1962 to 1964.

Hunter Success Data	Year 1962	1963	1964
No. of Hunter-hours	165.5	244	296.25
No. of Birds Seen	125	223	251
No. of Birds Shot	108	132	123
Birds Seen/100 Hunter-hours	76	91.4	84.7
Birds Shot/100 Hunter-hours	65.3	54.1	41.5
No. of Hunter-hours/Bird Seen	1.3	1.2	1.2
No. of Hunter-hours/Bird Shot	1.5	2.0	2.4
Occasions dogs used	8	24	39
Occasions dogs not used	39	33	37

Table IV Ruffed grouse hunter success on roads 1962 to 1964

Hunter Success Data	Year		
	1962	1963	1964
No. of Hunters	11	28	32
Miles Travelled	564	1411	2541
No. of Birds Seen	51	155	124
No. of Birds Shot	32	81	78
Miles/Bird Seen	11.1	9.1	20.5
Miles/Bird Shot	17.6	17.4	32.6
Birds Seen/100 Miles	9.0	11.0	4.9
Birds Shot/100 Miles	5.7	5.7	3.1

The distribution of hunters in Figure 2. reflects the roads systems rather than good grouse habitat.

The peak kill occurred during the fourth week of the season, one week earlier than in 1963. The fourth, fifth and sixth weeks of the open season has been the usual time of high kills in this District, coinciding with leaf fall.

Sex and Age Ratios

During the course of the present study both wings and tail of individual birds were submitted in the fall by co-operating hunters, and in addition, department field staff sent in similar specimens collected during their road patrols. The number of samples submitted this year was the same as in 1963. Ninety-four usable sets of wing and tail feather were examined in the District Office and twenty-one ruffed grouse were aged and sexed in the field. Six spruce grouse samples were obtained from interested hunters. Sex and age criteria used were based on the work of Hale et al (1954). The results of these examinations are summarized in Table V.

Table V Sex and age ratios of ruffed grouse

Juvenile Male grouse		49		
Juvenile Female grouse		34		
Total Juveniles				83*
Adult Male Grouse		15		
Adult Female Grouse		13		
Total Adults				28
Total Birds Sexed and Aged				111
	Male		Female	
Sex Ratio of Adults	15	:	13	1:0.87
Sex Ratio of Juveniles	49	:	34	1:0.69
Total Sex Ratio	64	:	47	1:0.73
	Juveniles		Adults	
Age Ratio	83		28	3.0:1
	Juveniles		Adult ♀	
	83		13	6.4:1 adult ♀

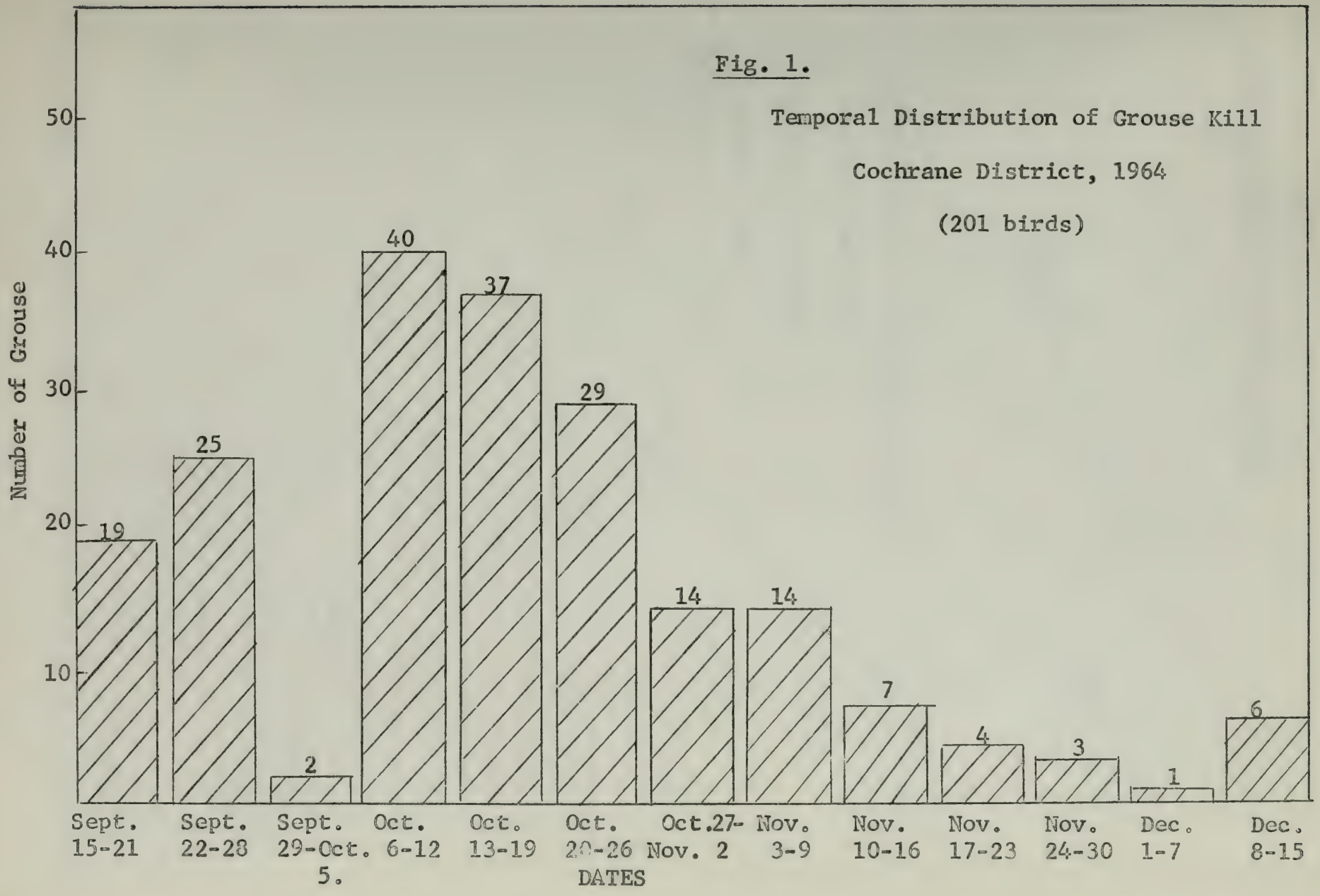
* 4 juvenile grouse not included - sex unknown - rectrices in blood quill stage.

Fig. 1.

Temporal Distribution of Grouse Kill

Cochrane District, 1964

(201 birds)



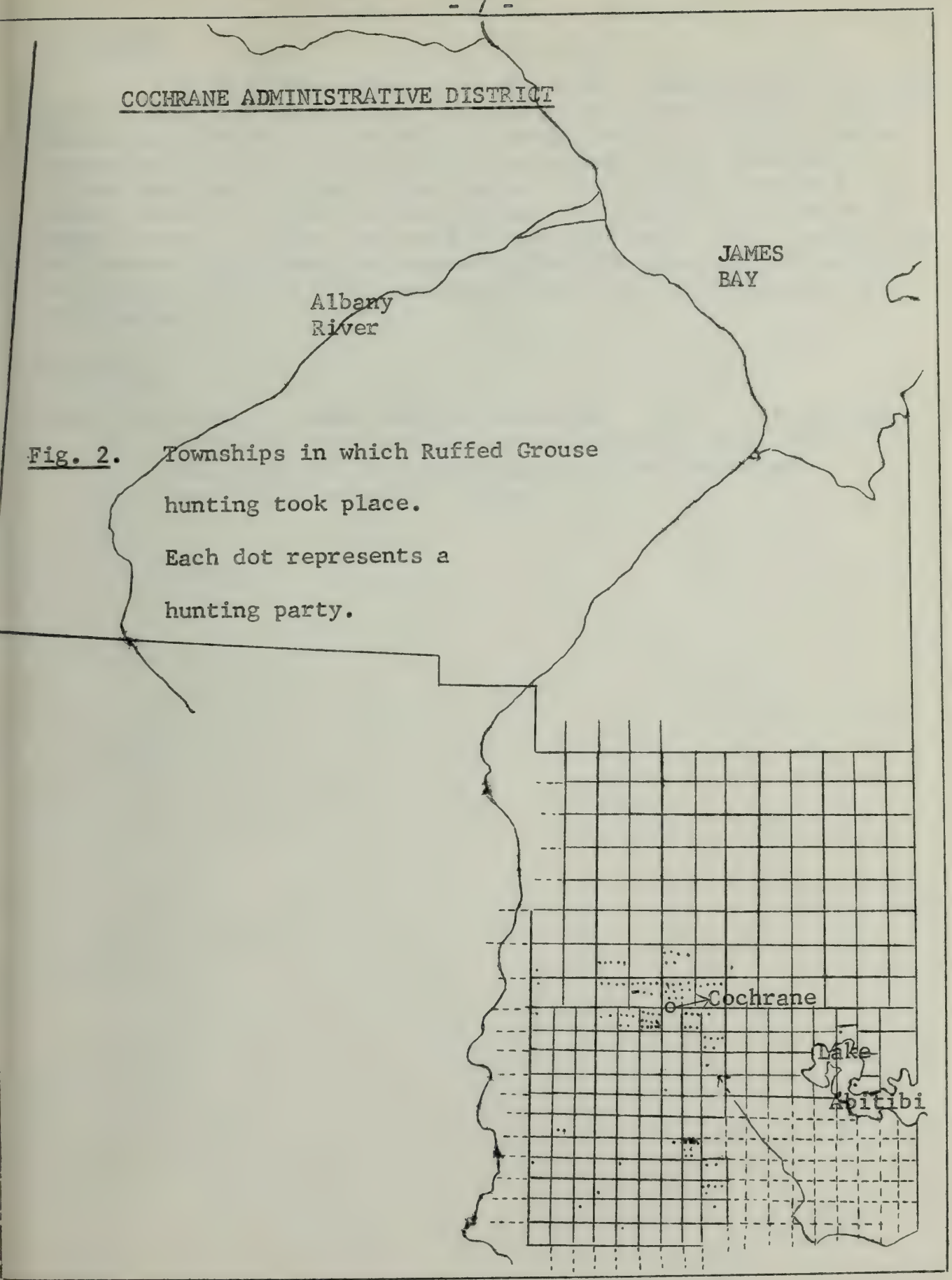


Fig. 2. Townships in which Ruffed Grouse hunting took place. Each dot represents a hunting party.

Discussion

In 1964 the grouse hunt was fair. Hunters on foot in the bush in 1964 saw more grouse than those sportsmen in 1963, yet failed to harvest the grouse. Sixty-two per cent of the grouse encountered in 1962 and 1963 were harvested but in 1964 only 49 per cent were bagged. What caused this drop in harvest is unknown? Hunting by car in 1964 was not as profitable. Number of grouse seen/100 miles decreased 56 per cent over 1963 observations and the resultant drop in grouse bagged/100 miles was 46 per cent. Reasons for the dearth of roadside grouse during the season are not available.

Reference

Hale, J. B., R. F. Wendt and G. C. Halazon. 1954. Sex and Age Criteria for Wisconsin Ruffed Grouse. Tech. Wildl. Bull. No. 9. Wisconsin Conservation Department, Madison, Wisconsin. 24 pp.

DUCK BANDING, GOGAMA DISTRICT, 1964

by
E. H. Lucking

Abstract

Since 1956, duck banding operations have been carried out on Halliday Lake, Halliday Township. During this time, 1999 blacks, 92 mallards, 4 green-winged and 1 blue-winged teal, 4 hooded mergansers, 3 ringnecked duck, 2 wood duck, 2 goldeneye, 1 pintail, and 1 American widgeon (baldpate) have been banded and released. Of these, 130 blacks, 15 mallards, 3 ringnecks, 1 pintail, 1 widgeon and 1 wood duck were banded in 1964. Of the total of 2185 ducks of all species banded up to 1963, 14.5 per cent or 326 have been recovered. Outboard traffic and especially high water have had a deleterious effect upon numbers of birds banded in recent years.

Traps and Preparations

Two weeks prior to the actual banding, the grass and weeds at the trap sites are cut, and the areas baited with cracked corn. In progressive stages of erecting the traps, the parts are dragged into the open, trap sides partly assembled, and the traps finally closed. During these stages, the areas are baited and left in partial construction to accustom and lure ducks to the trap sites.

Once completed the traps are of a welded wire construction, with cotton netting as a roof. They stand in 10" to 12" of water, over a hard sandy bottom, next to shore.

The five foot high trap is in the shape of a clover-leaf, with narrow slit openings at the joining of the "leaves". A small holding pen (2' x 2' x 5') placed on dry land, opens into the side of the trap to allow handling the ducks without the bander entering the trap itself. A detailed description of these traps can be had by referring to the 1962 and 1963 reports.

Banding

Each morning, the crew of two men made rounds of the six traps banding and releasing new ducks, as well as recording all previously banded birds. The operation opened on August 19 and closed on September 11 -- a total of 24 days.

Results

The overall success of the banding operations is greatly reduced from the previous two years.

Year	Days Operated	Blacks	Mallards	Others	Total
1964	24	130	15	6	151
1963	24	229	19	-	248
1962	23	246	15	2	263
1961	24	108	4	-	112
1960	26	158	5	-	163
1959	27	197	1	-	198
1958	24	267	11	5	283
1957	22	193	11	2	206
1956	24	448	11	4	463

Most ducks banded during this operation are resident birds, and any disturbance has an effect upon their numbers. During any year of high water (such as 1964, 1960) more tourist outboard traffic during the late spring and summer months is seen along the Grassy River watershed. The effect of this disturbance plus the high water is even more drastically reflected in May, for pair counts, and again in July, for brood counts. For the past two years, no broods have been sighted along 17 miles of the Grassy River. High water allows better chances of hiding, and any broods are probably farther back in the reeds.

This same high water also affects the actual trap sites. Chosen for surrounding areas, plus some degree of exposure, the sites are in some 10" of water, at normal levels. Any raising of this level decreases trapping due to less than optimum conditions.

Two further factors influencing the take of birds are noted. Referring to the attached map, Able Trap is seen on an exposed point facing the open lake. The bottom at this site is very firm and sandy. Because of the past success at this location, Baker Trap, in the bay behind, was considered somewhat redundant. Baker was therefore moved -- into the southern portion of Halliday Lake, which had no traps at all. Even the limited catch enjoyed up to 1962 was denied as no birds, nor any evidence of feeding at the bait, were seen at this new site.

Mink predation at Able Trap greatly curtailed the efficiency. Up to August 27 when the first kill was reported, 76 ducks (including both new birds and repeats) were taken. Thereafter, only 11 birds were trapped. Able trap had only three kills, total.

However, Dog Trap, with six kills, seemed to suffer no ill effects due to the mink kills themselves.

Success by Banding Site, 1960-64

Trap	Species	1964	1963	1962	1961	1960
Able	Black	31	118	114	42	63
	Mallard	4	8	7	2	2
Baker	Black	-	-	21	19	4
	Mallard	-	1	1	-	1
Charlie	Black	62	45	16	21	27
	Mallard	6	3	2	-	1
Dog	Black	28	7	32	2	8
	Mallard	2	2	1	-	-
Easy	Black	8	16	24	6	52
	Mallard	3	3	2	1	1
Harry	Black	1	43	26	13	2
	Mallard	-	2	1	1	-

Harry trap, with only one black and one black repeat, was a disappointment. On several consecutive days, ducks were seen in the trap area, and the bait cleaned up. Some escapes occurred both here and at Easy trap. The presence of overhanging brush may be obscuring the trap site, bait or no bait.

Age and sex composition tables are presented:

Age and Sex Composition - 1964

Species	Adult ♂	Adult ♀	Imm. ♂	Imm. ♀	% Imm.	Imm./Adult ♀
Blacks	8	12	52	58	85	9.2
Mallards	-	2	9	4	87	6.5

Age and Sex Ratios:

	1964	1963	1962	1961	1960
Blacks					
Per cent Imm.	85	92	92	80	82
Imm./Adult ♀	9.2	16.9	16.3	16.4	7.7
Mallards					
Per cent Imm.	87	79	64	75	100*
Imm./Adult♀	6.5	7.5	9.0	3.0	5.0+

* 1960 - Only 5 birds banded - all immature.

The number of mallards banded is not sufficient for reliable sex-age determinations. However, enough black ducks are newly banded to allow some comparison of ratios. Over the past five years, 1960 and 1964 have both had small returns in numbers of birds -- and a lower ratio of juvenile to adult females. The years of higher ratios, 1961-62-63 are also years when no high water was reported, possibly contributing to better hatching conditions. The lower number of birds banded in 1961 (112) is unexplained, yet the high age ratio was upheld.

Banding Returns

Of all ducks banded (not including 1964), a total of 326, or 14.5 per cent have been recovered to date. At writing, no reports have been received of any recoveries from 1964 fall duck hunting.

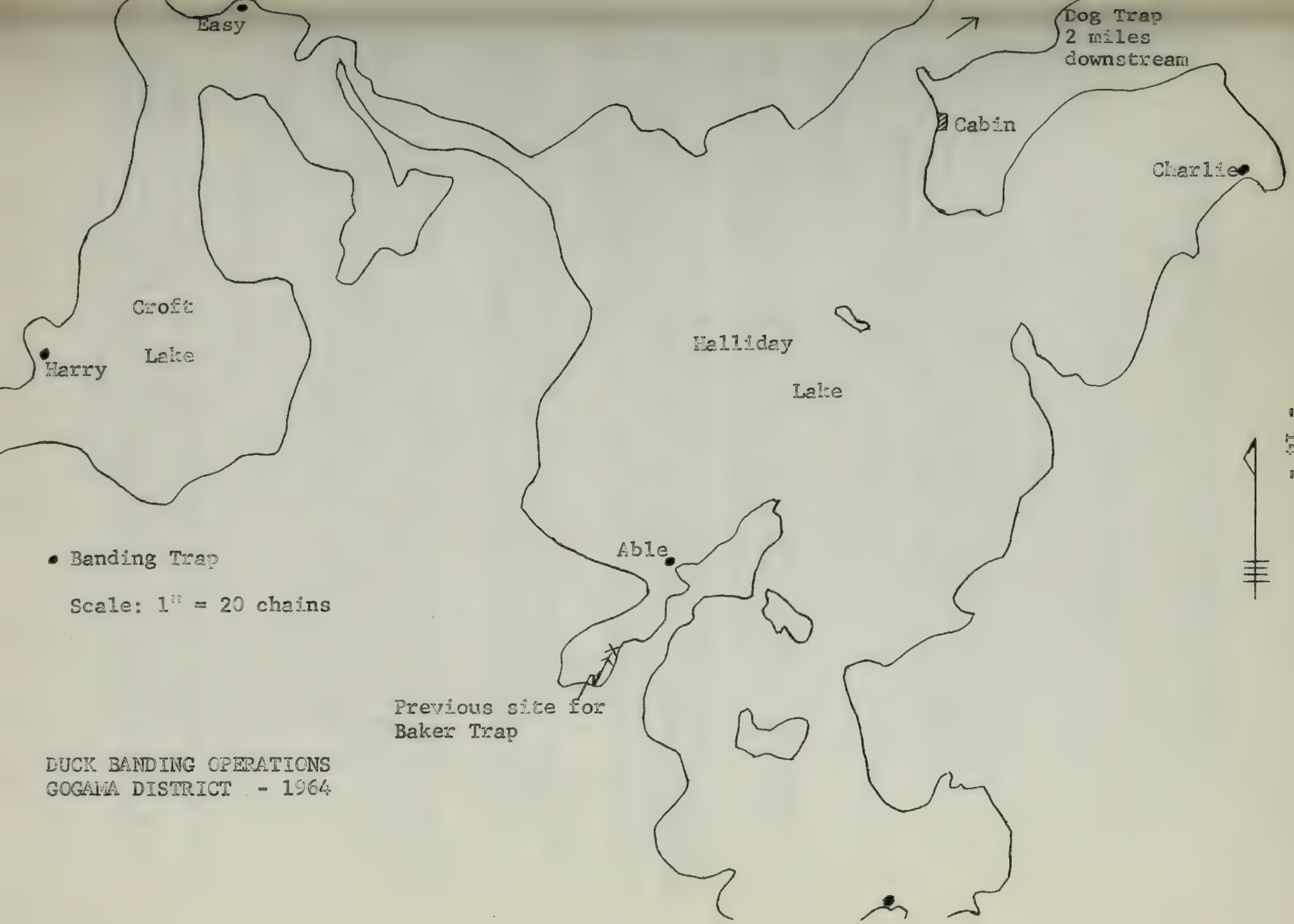
Conclusions

The results of this yearly project, though low in absolute numbers, is worth continuing for the large percentage of recoveries obtained.

The past and present successes of all traps, excluding Baker, would preclude any re-locating. They have shown to be good sites, and will require even more trapping protection against predators.

A more extensive clearing of the trap site may be the answer to rejuvenating those traps which have fallen off.

To offset the decline in success due to high water over the trap sites, wooden platforms should be constructed and covered with a thin layer of sand, then raised or lowered to maintain optimum water depths.



DUCK BANDING OPERATIONS
GOGAMA DISTRICT - 1964

A COMPARISON OF METHODS OF OVERWINTERING PHEASANTS, WHITCHURCH TOWNSHIP, LAKE SIMCOE DISTRICT, 1963-64

by
G. F. Love, Conservation Officer

Abstract

When pheasants were overwintered under two conditions, half in open pens and half in enclosed pens, it was found that the birds kept outside suffered a greater loss and were in poorer conditions by spring than those kept inside.

Introduction

During the spring of 1963 it was decided to overwinter 400 to 500 pheasants in the township of Whitchurch so that they could be released as adults the following spring.

The outdoor holding pens (dimensions 50' x 100') owned by the Township's Game Commission, were inadequate to support this number of birds so they rented a barn, which had been used as a chicken-house, to increase their pen area. The barn used for housing the birds measured 30' x 40'.

It was decided that half the birds would be kept in the outdoor pens and half in the barn. Therefore, the purpose of this report is to compare these two methods of overwintering pheasants.

The majority of the birds were raised from chicks obtained in June and July. In addition to this some adults were obtained from Sibbald Park in the fall. In order to overwinter the birds in the enclosed pens they were transferred from the open pens during the summer. The spring release took place on March 28, 1964.

Methods

Number of Birds

By the fall of 1963 there was a total of 520 pheasants to be kept over winter. They were divided into two lots of 260 pheasants each, half were kept in open pens at Gormley and half in a chicken-house at Vandorf. The approximate ratio of these birds was four females to one male.

Care of the Birds

(1) Feeding

The birds were fed and cared for by one person until the time half of them were removed to the barn at Vandorf. After this they continued to be cared for but each lot by a different person.

From 12 weeks, the birds were fed to the adult stage on a mixture of two parts hard wheat, two parts cracked corn and one part oats. When any sign of poor condition was noted in the birds, a quantity of turkey grower pellets was added to the diet. Throughout the winter the birds were fed almost entirely on cob-corn. After freeze-up the birds outside obtained water from the snow. The birds kept inside were fed snow as well, but also had one heated water-fountain. A supply of gravel was present for the birds' use at all times.

(2) Cover

Bundles of corn stalks were placed in the corners and around posts to provide cover. After the new year, Christmas trees were collected and piled in the pens for cover and hiding places for any weak birds.

(3) Debeaking

The birds were not debeaked as it was felt that this would hamper their survival after they were released. A certain amount of picking took place during the poult stage but it was found that this could be controlled by providing a balanced diet and by adding a mixture of two tsps. common salt, two tsps. epsom salts and two tsps. baking soda to each pail of drinking water.

Results

Number of Birds

The following is a table showing the comparison of the per cent loss of birds in open and enclosed pens during the over-wintering process.

Table #1

	No. of Birds at Beginning	No. of Birds at time of Release	No. of Birds Lost	% Loss
Open Pens	260	206	54	20.8
Enclosed Pens	260	229	31	11.9
Totals	520	435	85	16.3

The ratio of the birds still remained approximately four females to one male in the spring.

Observations

Care of the Birds

(1) Feeding

It was found that a diet of finer food was necessary during the poult stage. When the birds became adults cob-corn was not only more economical, but also provided an adequate diet and helped keep the birds occupied removing the kernels from the cobs and giving them fewer opportunities to pick one another.

(2) Cover

The bundles of corn stalks and evergreen trees in the pens not only supplied cover for the birds, but also kept the pheasants occupied picking at the corn stalks and stripping the green needles and bark from the trees.

(3) Debeaking

The fact that the birds were not debeaked did not appear to increase cannibalism to any great extent.

Although the birds were in equally good condition to start with in the fall, those kept in the barn (in approx. 1/4 of the outside pen area) were noticeable in better condition at the time of release. They were not only heavier, but their plumage was in better condition as well.

Discussion

Although the birds kept outdoors were cared for in practically the identical manner as those kept indoors, it was found that their loss was almost double that of the latter. (20.8% loss as compared to 11.97%). It was also found that the birds overwintered inside were in better condition at the time of release. The reason for this is as yet undetermined.

It would appear that one sex is not any more hardy than the other, since the ratio of male to female remained constant from fall to spring.

Cannibalism was much more prevalent during the poult stage than among the adult birds. Therefore, it seems necessary to try to keep a balanced diet for the poults and to keep them in as good condition as possible during this crucial time. From the time the cold weather came there was also less trouble with picking, and a diet consisting mainly of cob-corn seemed to provide the best possible feed.

It appeared that picking occurred at times when the birds had nothing to occupy their attention and everything possible should be done to keep some type of material before them at which they can peck. Things such as green grass in the fall and stalks of corn, cobs and evergreen trees during the winter seemed ideal along this line.

Although the area per bird in the barn was much less than desired, cannibalism was not an extreme problem, due possibly to the birds being fed cob-corn.

The fact that the males and females were left together and not kept in separate pens, did not seem to be a disadvantage. There were no cases of extreme fighting at the start of the breeding season. It may have been an advantage that a good many of the females had been bred at the time they were released.

Acknowledgments

I wish to thank the members of Whitchurch Conservation Club who so willingly took on this project and especially Harold Botham and Fred Kirstein who cared for the pheasants and passed on a good deal of valuable information.

MOOSE BROWSE AND PELLET STUDIES IN THE KAPUSKASING DISTRICT, 1965

by
G. M. Hendry, Biologist

Abstract

A modified Passmore-Hepburn type range appraisal was carried out on a 4.4 square mile moose winter concentration area during May, 1965, in the Kapuskasing District. Subsequent examination of the data collected revealed that between 6.3 per cent (balsam) and 61.3 per cent (cherries) of the browseable stems were utilized. As high as 19.0 per cent of the mountain ash and 13.2 per cent of the maple stems were killed. The percentages of stems hedged ranged from 1.0 for balsam to a high of 30.0 for willows. The calculated total number of browseable stems per acre on the surveyed area is 6,306 with balsam being the predominant browse species. Pellet count data suggest an average density of from 9.20 to 14.18 moose per square mile on the survey site during the 210 day period since leaf fall in 1964.

Introduction

During the winter of 1963-64, an area was discovered 20 miles southwest of the Town of Kapuskasing on which a high density of moose was encountered. In May of 1964 an intensive browse survey was conducted to establish the degree of range utilization by moose on the new area (Hendry, 1964). However, flights over the area during the 1964-65 winter revealed very few animals. In order to obtain a clearer picture of moose activities in the area, a general type browse survey was conducted in May, 1965. This report contains the data collected during the 1965 survey.

Description of the Area

The area surveyed lies approximately 20 lineal miles southwest of Kapuskasing in the southwest and northwest corners of Parnell and Ecclestone Townships, respectively. It is 4.4 square miles in area and is bordered by Parnell Creek on the north, the Opasatika River on the east, an unnamed creek on the south and a mature mixedwood stand on the west (see attached map*). There are only two possible routes of access to the area. The first of these is via the Opasatika River when high water conditions exist. The second is by way of a private lumber road. Co-ordinates of the site are 49° 11' 40" N. latitude and 83° 00' 00" W. longitude.

*Map-Accompanied the original report now in the Fish and Wildlife Library, Maple.

The survey site was clear cut for pulpwood species from 1946 to 1955. Removal of the climax spruce resulted in an abundant growth of alder, balsam and maples in descending order. Less abundant species include dogwoods, poplars, white birch, hazel, willows, mountain ash and cherries. In many places the alder is so abundant that it impedes movement of man and animal. Overmature birch and poplar occur sporadically throughout the area.

The site is on a plain of high lime silty clay (Gill Clay) covered in places by a layer of peat six inches or more in depth. Numerous small esker type ridges, usually running in an east-west direction, are found in the area. Between these ridges, swamp conditions supporting black spruce and white cedar exist. The ridges support the hardwoods and balsam fir. Most of the area is quite wet as a result of poor drainage.

The survey site was originally chosen after winter air and land inspections revealed a very high moose density. Ground checks of the area on Dec. 14 and Dec. 15, 1963, established that a surprisingly large number of fresh moose beds, droppings and tracks were present. Subsequent aerial surveys on January 22 and January 26, 1964, resulted in counts of 40 and 54 moose, respectively.

Method

A. Browse Survey

The survey commenced on May 13 and was completed by May 18, 1965 at which time leaf buds were open but the leaves not fully developed. A modified version of the Passmore-Hepburn system of range appraisal was used as described by Biologist, J. B. Dawson in a memorandum of April 11, 1963. The cruise lines were preselected to reduce bias and marked on an F.R.I. map of the area. The Opasatika River was used to gain access to the area since the water level was high in early May.

Two 2-man crews were used in order to minimize the length of time to complete the project as well as to enable more personnel to gain experience in this type of work. Using a sampling rate of 64 times the square root of the area (4.4 sq. mi.) a total of 136 plots were required. Four chain intervals were maintained between plots. Individual plot size was 66 feet by 2 feet or 1/330th of an acre. Compass bearings of true east and west were used in running the transects. Only one of the 10 common browse species, june berries, was not encountered during the survey. Observations of browsing on the other nine species were made one foot on each side of the chain.

Plot Records

Entries on each tally sheet* were made under the following headings:

(a) Under L - The number of living stems of each of the 10 species or genera listed. This column refers to browseable stems between two and 10 feet above ground level.

(b) Under B - The number of stems in each of the 10 species which have been browsed during the current season (fall to spring).

(c) Under K - The number of stems in each of the 10 species which have been killed by past moose browsing. This did not include stems killed by other causes such as mice or hares.

(d) Under H - The number of stems in each species which show the results of moderate to heavy browsing. After many years of continuous browsing the natural growth form of the tree will be conspicuously altered. In the early stages this type of hedging may produce more browse through the effect of branching. In more advanced stages the plant is weakened, and often portions of the plant will have been killed by continued browsing pressure.

Compilation

The data collected have been analyzed with the following results:

(1) Frequency Index - A measure of the distribution over the area sampled, calculated as:

$$\frac{\text{No. of Plots on which each Species occurs}}{\text{No. of Plots in the Sample}}$$

1. White Birch $\frac{59}{136} = 0.43$

2. Balsam $\frac{126}{136} = 0.93$

3. Mountain Ash $\frac{51}{136} = 0.38$

4. Willows $\frac{50}{136} = 0.37$

* Retained in Fish and Wildlife files, Kapuskasing.

5. Maples - $\frac{56}{136}$ = 0.41

6. Dogwoods - $\frac{56}{136}$ = 0.41

7. Cherries - $\frac{13}{136}$ = 0.10

8. June Berries ----------

9. Poplars - $\frac{78}{136}$ = 0.57

10. Hazel - $\frac{20}{136}$ = 0.15

(2) Living Stems of Each Species per Acre - A measure of productivity, calculated as:

$$\frac{\text{EL X 330}}{\text{No. of plots in Sample}}$$

1. White Birch - $\frac{199}{136}$ x 330 = 483

2. Balsam - $\frac{938}{136}$ x 330 = 2,276

3. Mountain Ash - $\frac{111}{136}$ x 330 = 269

4. Willows - $\frac{150}{136}$ x 330 = 364

5. Maples - $\frac{419}{136}$ x 330 = 1,017

6. Dogwoods - $\frac{365}{136}$ x 330 = 886

7. Cherries - $\frac{31}{136}$ x 330 = 75

8. June Berries ----------

9. Poplars - $\frac{215}{136}$ x 330 = 522

10. Hazel - $\frac{171}{136}$ x 330 = 415

(3) Percentage of Stems Browsed - A measure of current use for each of the 10 species, calculated as: $\frac{EL}{EL} \times 100$

1. White Birch - $\frac{98}{199} \times 100 = 49.2\%$

2. Balsam - $\frac{64}{938} \times 100 = 6.8\%$

3. Mountain Ash - $\frac{67}{111} \times 100 = 60.4\%$

4. Willows - $\frac{86}{150} \times 100 = 57.3\%$

5. Maples - $\frac{172}{419} \times 100 = 41.0\%$

6. Dogwoods - $\frac{214}{365} \times 100 = 58.6\%$

7. Cherries - $\frac{19}{31} \times 100 = 61.3\%$

8. June Berries ----------

9. Poplars - $\frac{71}{215} \times 100 = 33.0\%$

10. Hazel - $\frac{73}{171} \times 100 = 42.7\%$

(4) Percentage of Stems Killed - A measure of past use for each of the 10 species, calculated as:

$$\frac{EK}{EK + EL} \times 100$$

1. White Birch - $\frac{3}{3 + 199} \times 100 = 1.5\%$

2. Balsam - $\frac{5}{5 + 938} \times 100 = 0.5\%$

3. Mountain Ash - $\frac{26}{26 + 111} \times 100 = 19.0\%$

4. Willows - $\frac{2}{2 + 150} \times 100 = 1.3\%$

5. Maples - $\frac{64}{64 + 419}$ x 100 = 13.2%

6. Dogwoods - $\frac{13}{13 + 365}$ x 100 = 3.4%

7. Cherries - $\frac{1}{1 + 31}$ x 100 = 3.1%

8. June Berries ----------

9. Poplars - $\frac{17}{17 + 215}$ x 100 = 7.3%

10. Hazel - $\frac{2}{2 + 171}$ x 100 = 1.2%

(5) Percentage of Stems in each species which show Hedging Effect - An additional measure of past use, calculated as:

$\frac{EH}{EL}$ x 100

1. White Birch - $\frac{9}{199}$ x 100 = 4.5%

2. Balsam - $\frac{9}{938}$ x 100 = 1.0%

3. Mountain Ash - $\frac{19}{111}$ x 100 = 17.1%

4. Willows - $\frac{45}{150}$ x 100 = 30.0%

5. Maples - $\frac{13}{419}$ x 100 = 3.1%

6. Dogwoods - $\frac{30}{365}$ x 100 = 8.2%

7. Cherries $\frac{5}{31}$ x 100 = 16.1%

8. June Berries ----------

9. Poplars - $\frac{28}{215}$ x 100 = 13.0%

10. Hazel - $\frac{3}{171}$ x 100 = 1.8%

(6) Percentage of Available Browse Supplied by all 10 Species Which Is Supplied by Each of the Species - A measure of relative availability, calculated as:

$$\frac{\text{EL (single species)}}{\text{EL (all species)}} \times 100$$

1. White Birch - $\frac{199}{2599} \times 100 = 7.6\%$

2. Balsam - $\frac{938}{2599} \times 100 = 36.1\%$

3. Mountain Ash - $\frac{111}{2599} \times 100 = 4.3\%$

4. Willows - $\frac{150}{2599} \times 100 = 5.8\%$

5. Maples - $\frac{419}{2599} \times 100 = 16.1\%$

6. Dogwoods - $\frac{365}{2599} \times 100 = 14.0\%$

7. Cherries - $\frac{31}{2599} \times 100 = 1.2\%$

8. June Berries ----------

9. Poplars - $\frac{215}{2599} \times 100 = 8.3\%$

10. Hazel - $\frac{171}{2599} \times 100 = 6.6\%$

Discussion and Observations

(1) Frequency Index - Balsam was the most widely distributed species, occurring on 126 of 136 or 93 per cent of the plots. Poplars were next in distribution being found on 57 per cent of the plots. The remaining species were grouped between 43 and 37 per cent except for hazels (15%) and the cherries (10%).

(2) Living Stems Per Acre - Balsam produced more browseable stems than any other single species encountered. Although poplars occurred on more plots than any of the remaining species, they produced less stems than the maples or dogwoods. The least productive species were willows, mountain ash and cherries in descending order. The calculated total of 6,306 browseable stems per acre suggests a medium to low quality moose range (Gibson, 1964; Hall, 1964; Hall, 1965, Armstrong, 1965).

(3) Percentage of Stems Browsed - The most heavily browsed species were cherries (61.3%), mountain ash (60.4%), dogwoods (58.6%) and willows (57.3%). Least browsed of the nine species found on the area was balsam with 6.8 per cent. For all species found with the exception of balsam, an overall average of 48.2 per cent of the available stems were browsed. This would indicate a moderately heavy utilization by moose. A preference for cherries, mountain ash and willows is indicated by the figures.

(4) Percentage of Stems Killed - Mountain ash showed the highest calculated percentage of stems killed from browsing (19.0 per cent). Maples were next with 13.2 per cent followed by poplars, dogwoods and cherries with 7.3 per cent, 3.4 per cent and 3.1 per cent, respectively. Balsam showed evidence of the lowest percentage of stems killed (0.5 per cent). The average calculated percentage of stems killed for all species amounted to 4.8 per cent. This indicates that the area has seen a moderate to heavy utilization in the past.

(5) Percentage of Stems Hedged - Willows exhibited the highest calculated percentage of stems hedged (30.0 per cent) followed by mountain ash, cherries and poplars with 17.1 per cent, 16.1 per cent and 13.0 per cent, respectively. Least hedged of the nine species were hazel (1.8%) and balsam (1.0%).

Considering the past and present degree of utilization, it is felt that the area is supporting the maximum number of moose possible and that any subsequent change in moose numbers will probably be a decrease.

(6) Percentage of Available Browse - Balsam contributed 36.1 per cent of the total available browse on the area. The highest of the other eight species were the maples and the dogwoods which contributed 16.1 per cent and 14.0 per cent, respectively. The species contributing the least to the total available browse were the cherries with 1.2 per cent.

B. Population Estimates from Pellet Group Counts

Moose pellet counts were recorded on the same plots as the browse counts. The strip width was 13.2 feet or 6.6 feet on each side of the chain. This produced plots of 1/50th of an acre in area. In mixed areas - that is, mixed coniferous and deciduous stands - all pellet groups lying on top of the leaves were recorded. In coniferous stands, all pellet groups which by colour and texture appeared to have been dropped since the autumn of 1964 were tallied. Leaf fall in the autumn of 1964 was completed by approximately Oct. 20th. All pellet groups lying on top of the leaves could be assumed to have been deposited after this date. A period of approximately 210 days lapsed from leaf fall to the completion of the survey (May 18).

The number of pellet groups recorded for each plot varied from zero to a high of seven crotisings. Most plots had from zero to three pellet group counts. A total of 136 pellet groups was tallied on the 136 plots.

Calculations From Pellet Group Counts

Results and Discussion

1. Average number of pellet groups per acre, calculated as the average count per plot X 50.

$$\text{Average count per plot} = \frac{136}{136} = 1.00 \text{ groups}$$

$$\text{Pellet groups per acre} = 1.00 \times 50.00$$

2. Moose-days per square mile, calculated as:

$$\frac{\text{Pellet groups per acre X 640}}{\text{Deposition rate (13)}}$$

$$\text{or } \frac{50.00 \times 640}{13} = 2461.53 \text{ moose-days per square mile}$$

3. Moose per square mile, calculated as:

$$\frac{\text{Moose-days per square mile}}{\text{Number of days of pellet deposition}}$$

$$\text{or } \frac{2461.53}{210} = 11.72 \text{ moose per square mile.}$$

Upper and lower limits at the 95 per cent confidence level were obtained from the frequency distribution of pellet groups as follows:

1. Number of Pellet groups per Acre

Number of Plots = 136
Sum of squares = 208
Degrees of freedom = N-1 = 135
Mean square of variance = $S^2 = \frac{EX^2}{n-1} = \frac{208}{135}$

Standard deviation = $S = \sqrt{\frac{EX^2}{n-1}} = \sqrt{\frac{208}{135}} = 1.241$

Standard error = $\frac{\text{Standard deviation}}{\sqrt{\text{Number of observations}}}$

or $S_{\bar{x}} = \frac{S}{\sqrt{n}} = \frac{1.241}{\sqrt{136}} = 0.106$

Applying a "t" test from the following formula $\pm t = \frac{(\bar{x}-u)}{s_{\bar{x}}}$, we can arrive at a statement of confidence or fiducial statement about the sample mean $(\bar{x})$ using the 5 per cent level of probability. By transposing in the above equation $u = \bar{X} \pm t\ s\ \bar{x}$.

From the "t" table t.05 for 135 degrees of freedom = 1.98

Population mean = u = sample mean $\pm$ (t.05) (standard error)

or u = 1.00 + (1.98)(0.106) = 1.21 for upper limits,

or u = 1.00 - (1.98)(0.106) = 0.79 for lower limits.

Therefore, in the sampled moose pellet counts, the mean number of pellet groups per plot is between 0.79 and 1.21. This range should be correct at the 95 per cent fiducial interval.

Therefore, the moose pellet counts per acre should range from 50 x 1.21 = 60.50 for upper limits or 50 x 0.79 = 39.50 for lower limits.

2. Moose-days per square mile

$= 60.50 \times \frac{640}{13} = 2978.46$ for upper limits

or $= 39.50 \times \frac{640}{13} = 1944.61$ for lower limits.

Therefore, on the sampled area the moose-days per square mile should range from 1944.61 to 2978.46.

3. Moose Per Square Mile

$$= \frac{2978.46}{210} = 14.18 \text{ for upper limits}$$

$$\text{or} = \frac{1944.61}{210} = 9.26 \text{ for lower limits.}$$

Therefore, in the sampled area, the mean number of moose per square mile should lie between 9.26 and 14.18 at the 95 per cent fiducial interval for the time period involved.

These densities are slightly higher than those resulting from the 1964 survey of the same area (8.57 to 12.67). This appears to prove that the animals were in the area sometime in the winter of 1964-65. However, since very few animals were spotted in January or February, 1965, they must have moved through the area in December and/or March and April. (A herd of 47 moose was spotted five miles north of the area of January 21, 1965).

Undoubtedly the area is supporting a relatively high winter moose population. In view of previous reports and the degree of present utilization a winter density of 11.72 moose per square mile is believed to accurately represent the situation.

Summary and Conclusions

1. A modified Passmore - Hepburn range appraisal was conducted on a 4.4 square mile area in the Kapuskasing District.

2. Between 6.8 per cent and 61.3 per cent of the browseable stems were calculated to have been browsed. Relatively high percentages of stems for all species were killed with mountain ash being the highest (19.0 per cent). Percentage of stems hedged ranged from 1.0 per cent to 30.0 per cent for balsam and willows, respectively.

3. A calculated total of 6,306 browseable stems per acre is present on the range surveyed.

4. Densities of moose were calculated from pellet groups to range from 9.26 to 14.18 animals per square mile during the winter of 1964-65.

5. It is believed that the range on which the study was conducted has reached its carrying capacity. If the present degree of browsing continues, the range will deteriorate in the very near future.

6. This area should be surveyed again within the next two years to determine any changes in moose density and/or range utilization.

Acknowledgments

Appreciation is extended to Conservation Officers F.F. Legace, S. St. Jules and W. J. Stack. The success of this project is due largely to their efforts.

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LAC DES MILLE LACS

(Preliminary Report)

1964-1965

by
C. E. Monk
Fisheries Management Officer, Port Arthur Forest District

Abstract

Lac des Mille Lacs was surveyed during the summer of 1964 by Port Arthur District Staff. Correlation of this survey and previous knowledge revealed: (1) an increase in the growth of walleye over the past 10 years, (2) a younger age group entering the commercial fishery, (3) an increase in fishing pressure. The survey indicated a rather large "catch per unit effort" of 210 pounds of fish per 1,000 feet of net. Productivity level of the lake may be close to four pounds of fish per acre.

Introduction

From a fisheries standpoint, Lac des Mille Lacs is the most important inland water in the Port Arthur Forest District. A large walleye population, easy access by anglers at anytime, an ever increasing number of sport fishermen, and the nearness to a large urban centre demand close scrutiny of the fisheries in this lake.

During late August and early September of 1964, an inventory type survey (similar to that outlined in Fish and Wildlife Circular F.W. 1-7 issued September 19, 1962) was conducted on the lake. Examination of the commercial fisheries during February, 1965, was conducted to supplement this survey. Total harvest by anglers during 1964 estimated by Conservation Officer William McKeown of Upsala is also included. An attempt is made to correlate this information, and to examine the walleye population as it exists in the lake.

Description of the Lake

Lac des Mille Lacs is situated within the Arctic watershed (nearly headwaters) at Longitude $90^{\circ}30'$, Latitude $48^{\circ}45'$. Physical features of the lake accent the irregular shoreline; four main basins and eight large bays all interspersed with many medium and small

islands and shoals. Form C. F.-76 included as Table I presents the "physical, chemical and morphometric" characteristics of the lake.

Fishery Sample

The fisheries were sampled with standard gill nets (mesh sizes included 1-1/2", 2", 2-1/2", 3", 3-1/2", 4", 4-1/2" and 5 inches each hung on the half with 18 meshes for the 4-1/2" mesh - 50 foot long of white nylon) set irregularly throughout the lake.

Every fish captured was recorded as to species, location, total length, weight, depth captured and date. In addition, scale samples, sex and gonad condition were collected from all walleye captured. Fish captured included:

595 Walleye - Stizostedion vitreum (Mitchell)
972 Cisco - Leucichthys sp.
109 Northern Pike - Esox lucius
47 White sucker - Catostomus commersonnii (Lacépède)
18 Long-nose sucker - Catostomus catostomus (Forester)
17 Perch - Perca flavescens (Mitchell)
6 Whitefish - Coregonus clupeaformis (Prescott)
3 Burbot - Lota lota

Catch Per Unit Effort

A total of 20 overnight sets (1,000 feet of each mesh size) were employed in tabulating "catch per unit effort" (C.U.E.). Five hundred and ninety-five walleye weighing 957 pounds were captured in 8,000 feet of gill net. Expressed in terms of "catch per unit effort" 120 pounds of walleye per 1,000 feet of net. Total "catch per unit effort" for all species amounted to 210 pounds. Commercial fisheries on the lake produce about 20 tons of whitefish annually, and the absence of this species from the survey is attributed to their habitat preference at the time: well scattered at mid-depths. We also note the substantial presence of forage fish (ciscoes at 30 pounds per 100 feet of gill-net).

Walleye Length Frequency

Walleye ranged in length from the 3" to 29" class. Length frequency for the entire 595 specimens is present in Figure I. Samples are plotted to the full inch (13.0" - 13.9" are interpreted as 13"). Highest frequency is noted at 15" - 16" and uniformily descending on both sides of this peak.

Walleye Growth Rates

Division of the lake into six separate areas and individually applying respective growth curves to detect different populations proved undesirable. Figure II presents the growth rate of walleye from Lac des Mille Lacs compared with walleye growth rates from Shebandowan and Lac La Croix. A deliberate attempt is made to compare the growth rate of Lac des Mille Lacs walleye to a lightly exploited population (Lac La Croix) and an exploited population (Shebandowan).

Figure III depicts the growth rate of walleye from Lac des Mille Lacs in 1954 and 1964. A striking increase of this growth rate testifies to our knowledge of increased fishing pressure in the lake over the past ten years.

Figure IV compares the growth of walleye sampled from the commercial fishery in March, 1954 and in February, 1965. The gear used in 1954 is unknown. Both samples, however, were taken at the eastern end of the lake near Reserve Bay. Again the increase in the growth of walleye is noted. The main significance, though, is depicted in the age at which walleye entered the commercial fishery in 1954 and again in 1965; age six and four respectively. Although both samples are small (82 and 72), the trend of increased growth accompanying increased fishing is portrayed.

Maturity

All walleye taken in the sample are scrutinized as to sex and gonad condition (mature or immature). Difficulty in determining sex under 12" resulted in the scale envelopes being marked unknown. Table III presents the length range compared to age class for both mature and immature male and female walleye. It would appear that males begin to mature at 14" and age class IV; female walleye mature at 15" and age class V. Because of the time of the survey (September), examination of the gonads revealed that the fish probably would have spawned the following spring (1965), and perhaps in many cases, the age at maturity would then indicate age class V for males and VI for females.

Sport Fishery

Because we have a comprehensive creel study of walleye taken annually from Lac des Mille Lacs, the following "angler-catch" estimate submitted by Conservation Officer William McKeown is worthy of consideration. It consists of a breakdown of the summer-winter catch, non-resident - resident catch, and tourist camp-camper-transient catches. For this reason we quote Mr. McKeown's estimate in its entirety.

"SUMMER - The tourist camps of Lac des Mille Lacs accommodated 4,000 registered non-resident guests for a period of one week each during the summer of 196[illegible]. There were also a minimum of 1,500 non-resident campers (trailers and tents) staying at various resorts for one week each. In addition, 1,000 campers tented for one week each on Lac des Mille Lacs. Transient non-resident anglers were estimated at 300 for two days each. Resident anglers including tourist, local, and transient are estimated at 6,800. Total summer anglers - 13,600.

"WINTER - An estimated 200 residents angled in Lac des Mille Lacs each week during January, February and March. This represented a total of 2,400 winter anglers.

"SUMMER CREEL

4,000 tourists rated at 24 walleye each (4,000 x 24 = 96,000 walleye)
1,500 campers rated at 24 walleye each (1,500 x 24 = 36,000 walleye)
1,000 transients rated at 12 walleye each (1,000 x 12 = 12,000 walleye)
300 non-resident anglers rated at 4 walleye ea. (300x4 = 1,200 walleye)
6,800 residents anglers rated at 8 walleye ea. (6,800x8 = 54,400 walleye)

"Total summer harvest of walleye = 199,200.

"Winter Creel: 2,400 winter anglers rated at 6 walleye each (2,400 x 6 = 14,400 walleye).

"Total harvest by anglers from Lac des Mille Lacs during 1964 was 213,600 walleye).

Commercial Fisheries

Two licences are active on the Lake fishing walleye during the winter of 1964. Approximately 36,000 pounds of walleye were harvested.

Total Walleye Harvest for 1964

The average weight of one walleye taken from Lac des Mille Lacs is arbitrarily estimated at 1-1/2 pounds. Combined angler and commercial walleye harvest would be 213600 x 1-1/2 pounds plus 36,000 pounds which equals 356,400 pounds.

Productivity

Lac des Mille Lacs contains 59,200 surface acres of water (exclusive of islands). The "morpho-edaphic" index T.D.S./M.D. for estimating fish production demonstrated by R. A. Ryder on Page 48 of "Chemical Characteristics for Ontario Lakes" indicate the lake should produce about 3-1/4 pounds per acre (T.D.S. = 64 and M.D. = 15 are presented in Table I of this report). Consideration of the

shore development factor (14.4), and transparency (5.5) also presented in Table I, as illustrated by C. A. Lewis in "Progress Report #2 of the Fisheries Inventory Work in the Patricias" would again shift the ultimate production of the lake. In 1964, a total estimate of 356,400 pounds of walleye, 18,000 pounds of whitefish and 12,000 pounds of pike were harvested. This represents an estimate of 6-1/2 pounds per acre of all species. Probably a more accurate assessment of the angler harvest would modify the production estimate of walleye taken annually. We suspect the productivity level of the lake lies somewhere between 3-1/4 and 6-1/2 pounds per acre.

Discussion

Most fishery surveys are examined in retrospect. During the past ten years, we have evidence of change in the walleye status of Lac des Mille Lacs. Similarily, we are aware of a rather large and vigorous population of fish in the lake. Our attention is directed to the relative ease with which walleye are taken either by angling or netting; the unusually high "catch per unit effort" explained in Table II, and an apparent abundance of food (cisco).

There is certainly a need at this time to expand our creel census on Lac des Mille Lacs.

Acknowledgments

(1) For guidance and advice in conducting the survey, correlating the data, and writing the report, we are indebted to the Fish and Wildlife Supervisor, Mr. C. A. Elsey, Port Arthur.

(2) For assistance in the collection of information, scale reading, and contributing a resume of the angler harvest from Lac des Mille Lacs, we are especially grateful to Conservation Officer William McKeown of Upsala.

(3) For collecting data and scale reading, we gratefully acknowledge the assistance of Mr. Paul Bougie, Port Arthur Net Section, Mr. Tim Timmermann, District Biologist, Mr. K. J. Tolmie, Wildlife Management Officer and Conservation Officers William Sameluk and Bernard Wall.

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TABLE I

Department of Lands and Forests

PHYSICAL, CHEMICAL AND MORPHOMETRIC SURVEY FORM

LAKE Lac Des Mille Lacs DATE September 9 19 64

MAXIMUM DEPTH 75 ft. SHORELINE LENGTH (Incl,islands 488 mi.

MEAN DEPTH 15 (est.) ft. SHORE DEVELOPMENT FACTOR 14.4

AREA 92.5 sq.mi. TOTAL DISSOLVED SOLIDS 64 ppm.

AREA 59,200 acres TOTAL ALKALINITY 22 ppm.

AIR TEMPERATURE 61 °F SECCHI DISC 5.5 ft.

DEPTH Under 60' ☐ Over 60' ☐		WATER TEMP. (°F)	OXYGEN (ppm.)	pH
0	0	61	11	6.6
5	10	61		
10	20	59		
15	30	58	9	6.8
20	40	56		
25	50	53		
30	60	48		
35	70	46	5	6.8
40	80			
45	90			
50	100			
55	110			
60	120			

TABLE II

Catch Per Unit Effort - Lac Des Mille Lacs (1964)
Pounds per 1000 Feet of Net (3000 Feet Lifted)

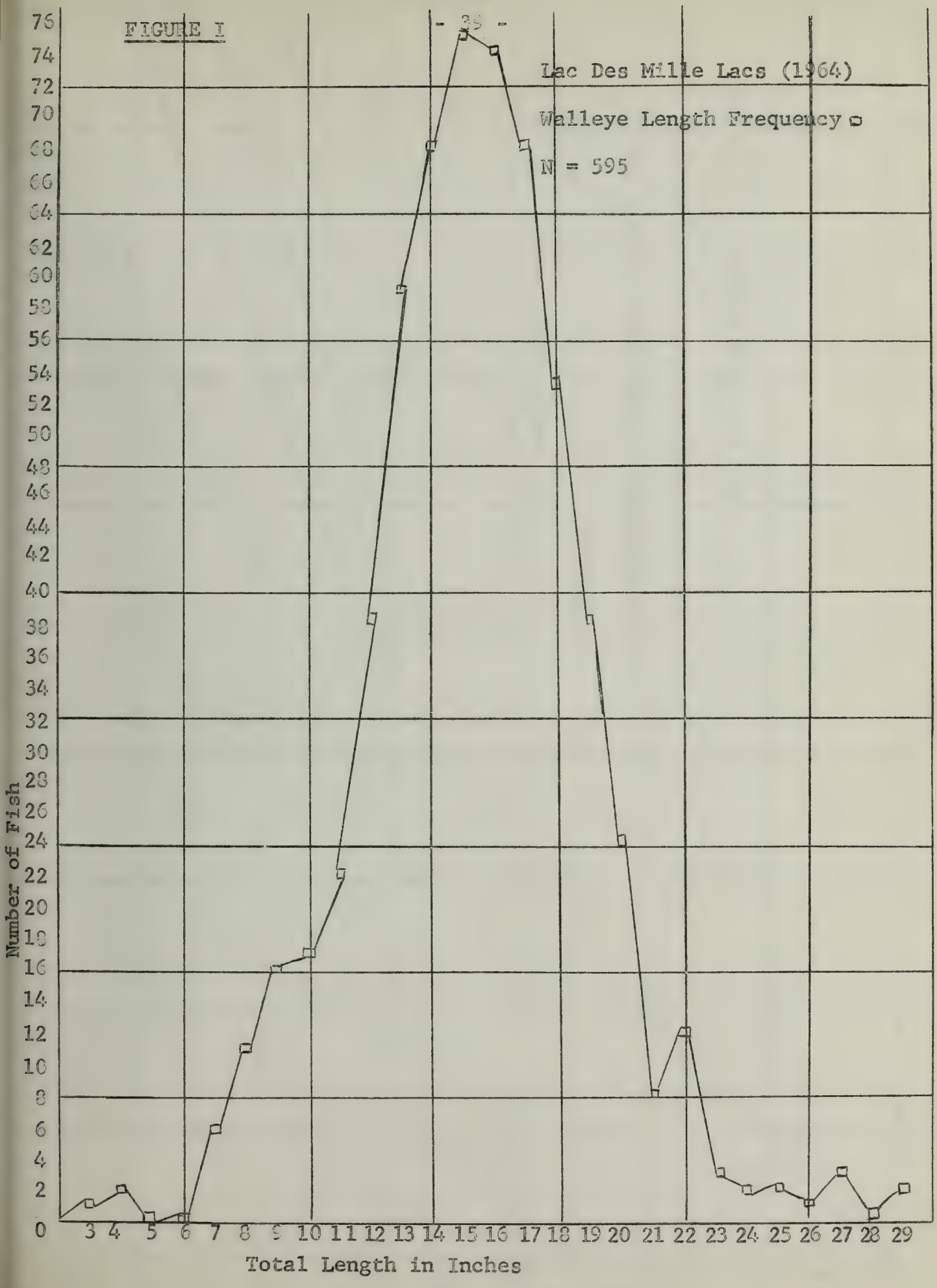
Species	Number	Weight	C.U.E.
Walleye	595	957.0	120
Cisco	973	257.5	30
Pike	109	365.5	40
White Sucker	47	103.8	10
Long-nose Sucker	18	60.0	7
Perch	17	16.3	3
Whitefish	6	14.0	0
Burbot	3	6.0	0
8	1767	1771.1	210

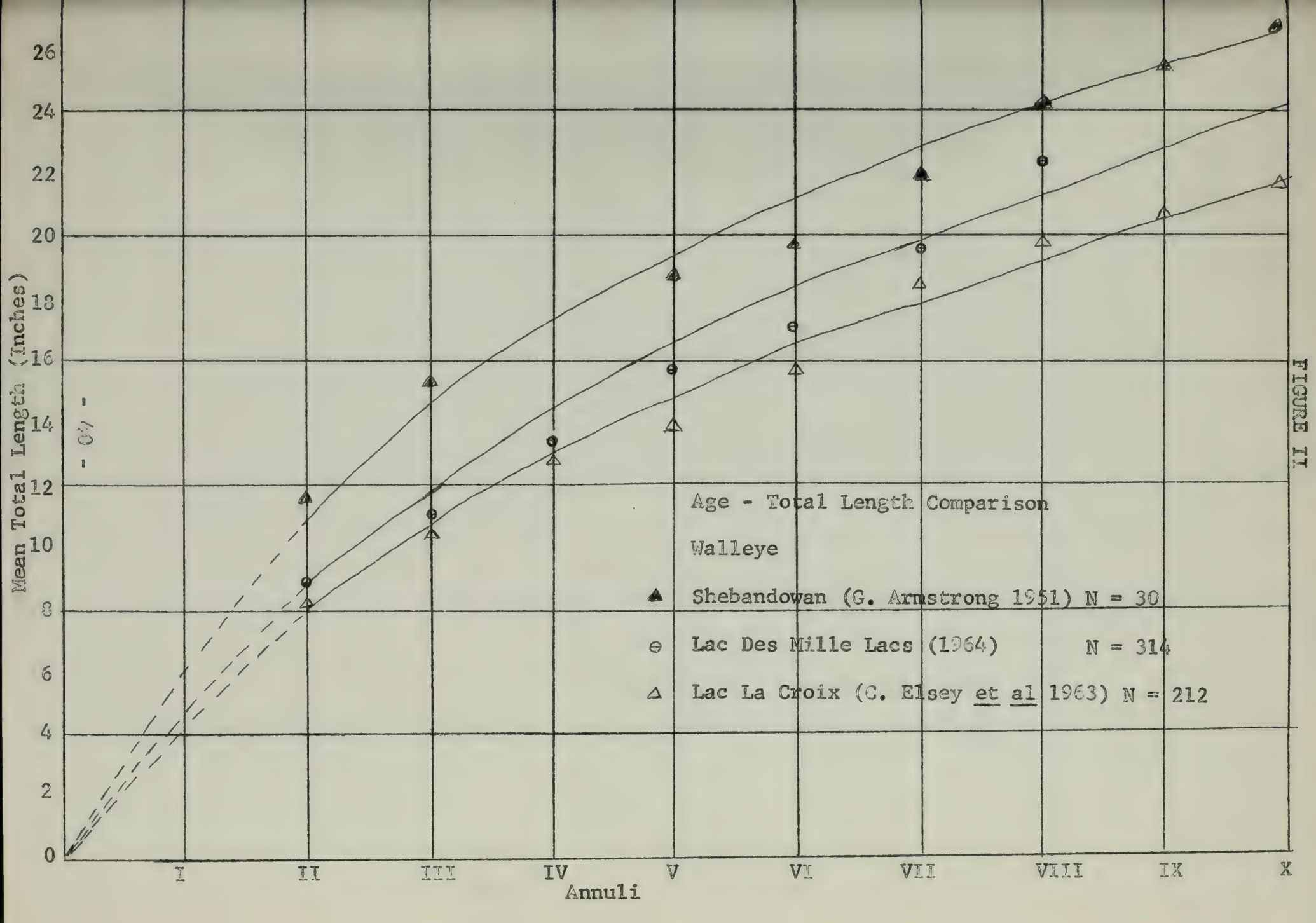
TABLE III

Lac Des Mille Lacs, Walleye ... 1964
Maturity ... Total Length ... Age ...
N = 225

Condition	Sex	Total Length Range	Age Range
Immature	Male	11.8 - 15.8	IV - V
Immature	Female	11.9 - 16.7	IV - VI
Mature	Male	14.1 - +	IV - VI - +
Mature	Female	15.2 - +	V - VI - +

FIGURE I


Lac Des Mille Lacs (1964)
Walleye Length Frequency
N = 595
Number of Fish
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
Total Length in Inches


Mean Total Length (Inches)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
I
II
III
IV
V
VI
VII
VIII
IX
X
Annuli
Age - Total Length Comparison
Walleye
Shebandowan (G. Armstrong 1951) N = 30
Lac Des Mille Lacs (1964) N = 314
Lac La Croix (C. Elsey et al 1963) N = 212

- 6½ -

FIGURE II

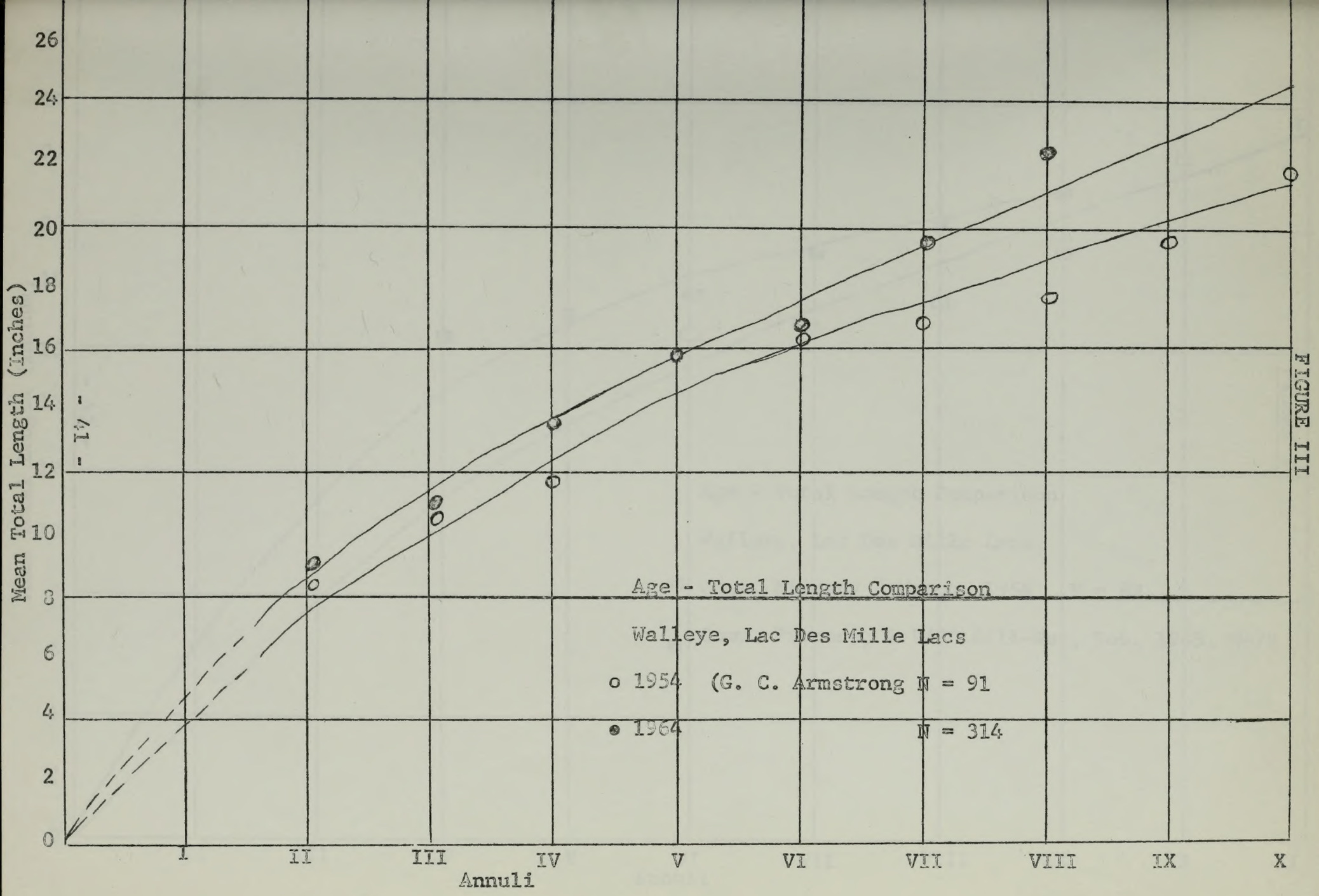
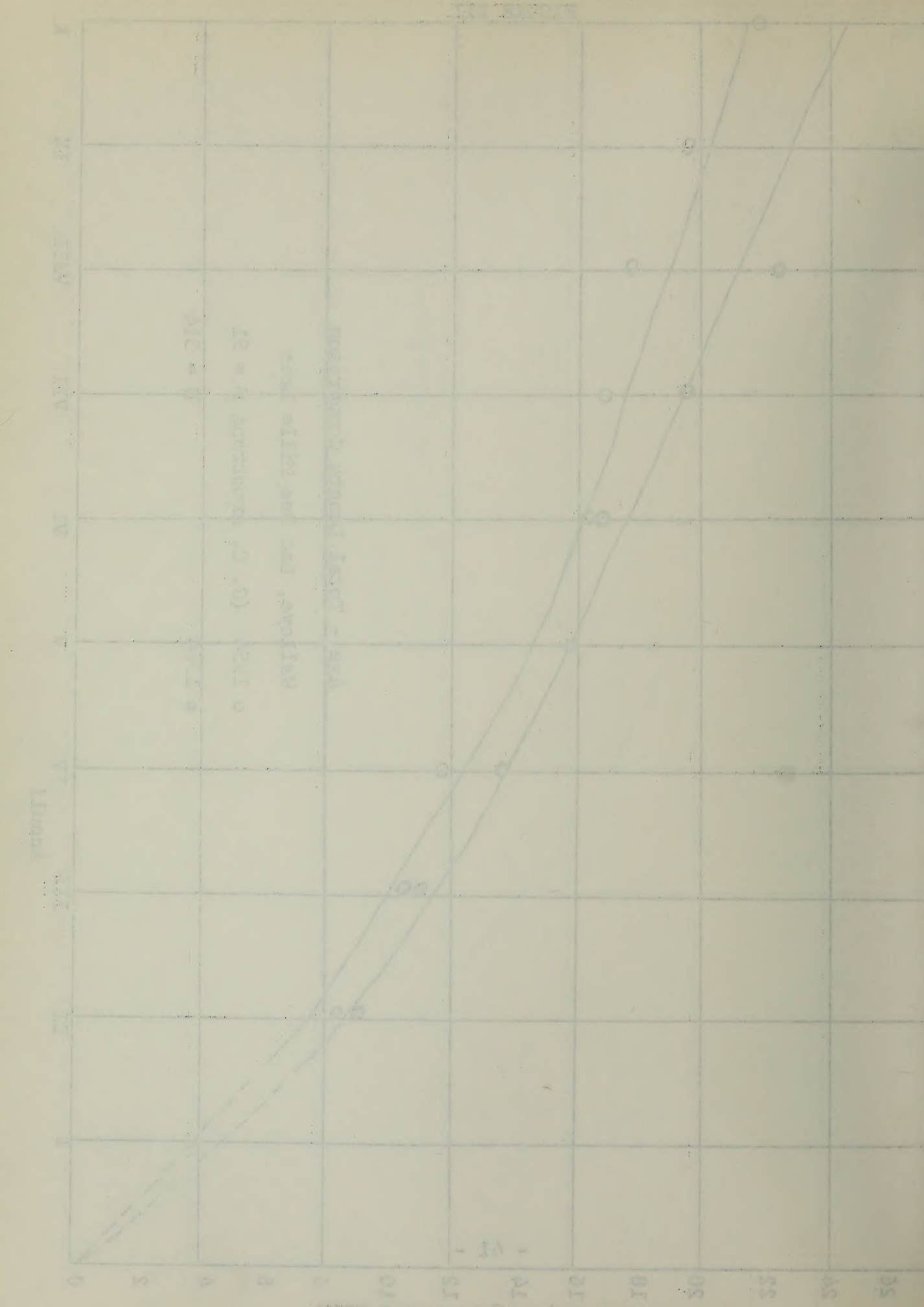

Mean Total Length (Inches)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
I
II
III
IV
V
VI
VII
VIII
IX
X
Annuli
Age - Total Length Comparison
Walleye, Lac Des Mille Lacs
o 1954 (G. C. Armstrong N = 91
• 1964 N = 314

FIGURE III



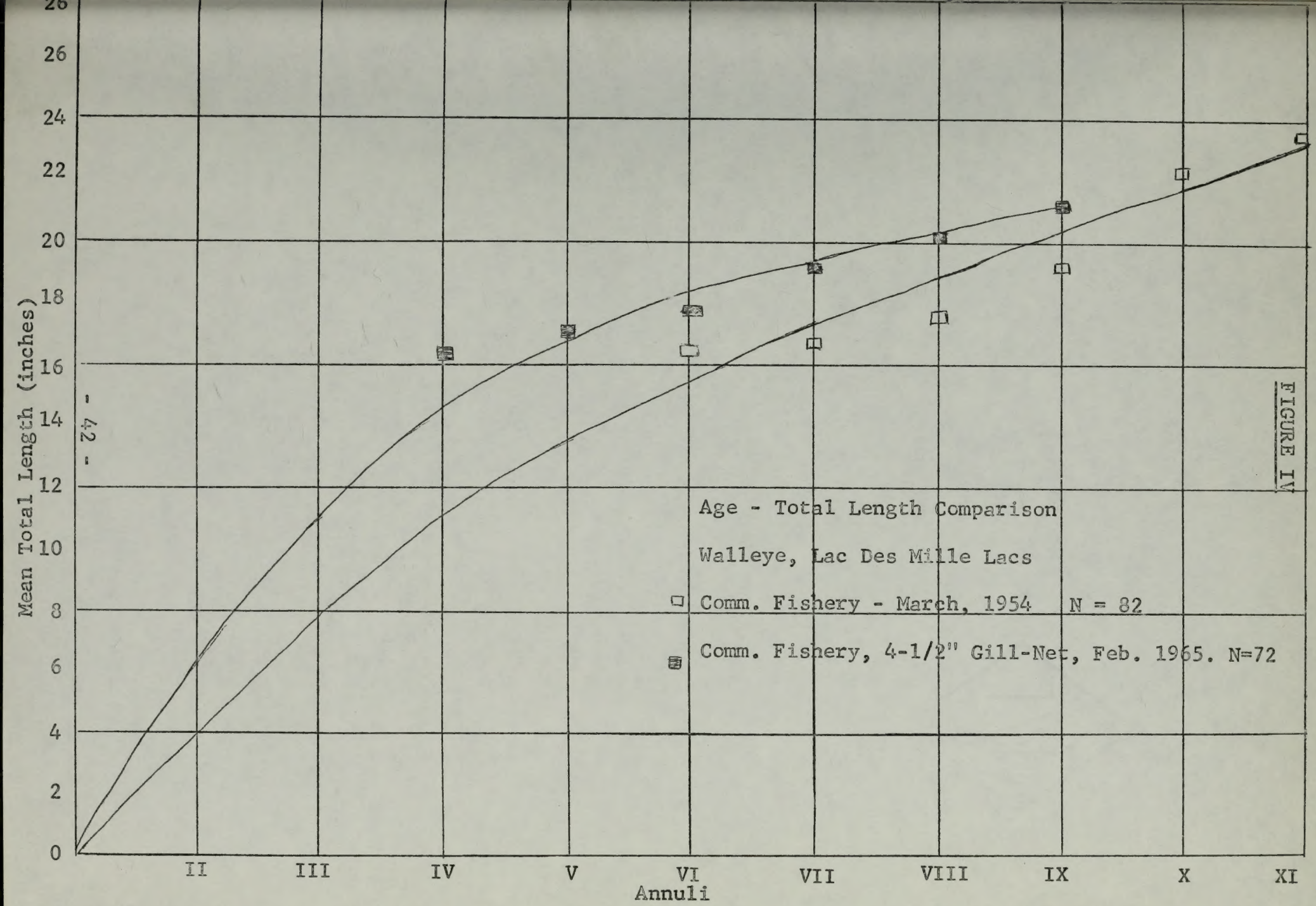

Mean Total Length (inches)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
II
III
IV
V
VI
VII
VIII
IX
X
XI
Annuli
Age - Total Length Comparison
Walleye, Lac Des Mille Lacs
Comm. Fishery - March, 1954 N = 82
Comm. Fishery, 4-1/2" Gill-Net, Feb. 1965. N=72

FIGURE IV